

# Real Time, Non-intrusive Detection of Liquid Nitrogen in Liquid Oxygen (LOX) at High Pressure and High Flow, Phase II

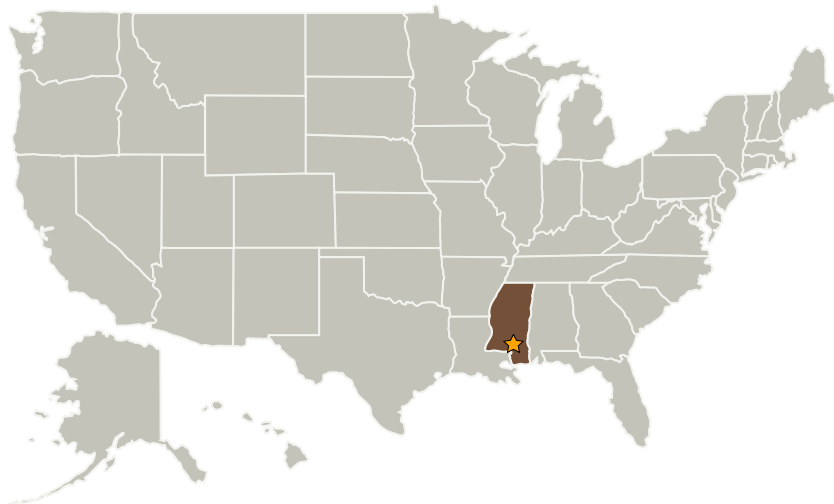
Completed Technology Project (2005 - 2007)



## Project Introduction

**Technical Abstract** The Stennis Space Center (SSC) needs the sensors that are capable and can be operated in liquid oxygen (LOX) and or liquid hydrogen (LH2) cryogenic environment to improve SSC cryogenic testing. In particular, SSC would like to develop a sensor to monitor the quality of LOX in the delivery line during the testing of a rocket engine. Spontaneous Raman scattering (SRS) with its relative simplicity and multi-molecule analysis can be easily employed to develop a sensor for on-line, real-time measurement. In Phase I we have designed an initial - prototype system for gas mixture and LN2 measurement. This proposed Phase II research is to design an integrated Raman system that will improve the sensor performance to satisfy NASA's need for LOX quality control. A calibration technique for the gas phase sensor will be developed. An optical access interface unit for the LN2/LOX mixture system will be designed. The performance of the integrated Raman system with LN2/LOX mixtures will be evaluated and the final prototype Raman system will be delivered to NASA/SSC.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Stennis Space Center (SSC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi
Mississippi Ethanol, LLC	Supporting Organization	Industry	Winona, Mississippi

## Primary U.S. Work Locations

Mississippi

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

Carlos Torrez

## Technology Areas

### Primary:

- TX01 Propulsion Systems
  - └ TX01.1 Chemical Space Propulsion
    - └ TX01.1.3 Cryogenic